

HEATER AND MANUFACTURE THEREOF

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Abstract

PROBLEM TO BE SOLVED: To provide a thin and light heater which can facilitate temperature control and prevent generation of thermal distortion by forming an heating element coated with a metal layer on its surface with metal particles or the metal particles and metallic oxide sintered on the surface of a plate-shaped body consisting of nitride ceramic or carbide ceramic.

SOLUTION: Fine particles of metal nitride ceramic such as AlN, or metal carbide ceramic such as SiC, are pressed and formed together with sintering assistant and binder and the like, and sintered at approx. 1,000 to 2,500 deg.C, so that a plate-shaped body made of ceramic (heater plate) 1 is obtained, whose thickness is approx. 0.5 to 5 mm, and which is formed with a through hole 8 or the like, if necessary.

Metal particles of gold, tungsten or the like, and if necessary, conductive paste including metallic oxide, such as Al₂O₃, are subjected to pattern printing, and heating sintering on the surface of the heater plate 1, and a metal coating layer 5 of Ni or the like is plating-coated on the metal particle sintered body 4 to form a heating element 2. After that, a terminal pin 3 is connected through a solder layer 6 of Ag-Pb alloy or the like.

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The ceramic heater comprising: a wafer-type laminated ceramic heater made of heat-decomposed boron nitride and heat-decomposed carbon; and a resistance heating element in this Utility Model is characterized in that:

the resistance heating element made of heat-decomposed carbon is designed such that the value of electric resistance value thereof increases gradually as it goes from the center to the periphery.

Figure 7

The figure which shows relationship between the position at the heater and the surface temperature of the heater.

Translation of Figure 7

Vertical axis: heater surface temperature ($^{\circ}\text{C}$)

Horizontal axis: the position at the heater (mm)

the value of 0 corresponds to the center and the value of 50 corresponds to the peripheral edge

The plots of \bigcirc represent example.

The plots of \triangle represent comparative example.

(End)